PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P 03 130 WO	**FOR FURTHER ACTION**	See Form PCT/PEA/416

International application No. PCT/DK2005/000103	International filing date *(day/month/year)* 17.02.2005	Priority date *(day/month/year)* 20.02.2004

International Patent Classification (IPC) or national classification and IPC

INV. A22C17/00 B26D7/06

Applicant

[NORFO A/S et Al.] *Scanvaegt International A/S*

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *sent to the applicant and to the International Bureau)* a total of 7 sheets, as follows:

      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   ☒ Box No. I   Basis of the report

   ☐ Box No. II   Priority

   ☐ Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

   ☐ Box No. IV   Lack of unity of invention

   ☒ Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   ☐ Box No. VI   Certain documents cited

   ☐ Box No. VII   Certain defects in the international application

   ☐ Box No. VIII   Certain observations on the international application

Date of submission of the demand 19.12.2005	Date of completion of this report 30.05.2006

Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Rojo Galindo, A Telephone No. +31 70 340-4367

Box No. I   Basis of the report

1. With regard to the **language**, this report is based on

    ☒   the international application in the language in which it was filed

    ☐   a translation of the international application into , which is the language
    of a translation furnished for the purposes of:
    ☐ international search (under Rules 12.3(a) and 23.1(b))
    ☐ publication of the international application (under Rule 12.4(a))
    ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

    Description, Pages

    1-16   as originally filed

    Claims, Numbers

    1-30   filed with telefax on 28.04.2006

    Drawings, Sheets

    1/4-4/4   as originally filed

    ☐   a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐   The amendments have resulted in the cancellation of:
    ☐ the description, pages
    ☐ the claims, Nos.
    ☐ the drawings, sheets/figs
    ☐ the sequence listing *(specify)*:
    ☐ any table(s) related to sequence listing *(specify)*:

4. ☐   This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
    ☐ the description, pages
    ☐ the claims, Nos.
    ☐ the drawings, sheets/figs
    ☐ the sequence listing *(specify)*:
    ☐ any table(s) related to sequence listing *(specify)*:

    *   If item 4 applies, some or all of these sheets may be marked "superseded."

Box No. V	**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes:	Claims	1-30
	No:	Claims	
Inventive step (IS)	Yes:	Claims	7,13,16,17,24,30
	No:	Claims	1-6,8-12,14,15,18-23,25-29
Industrial applicability (IA)	Yes:	Claims	1-30
	No:	Claims	

2. Citations and explanations (Rule 70.7):

   see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement.

1. Reference is made to the following documents:

   D1: US-B1-6 407 818 (WHITEHOUSE JOHN ARTHUR) 18 June 2002 (2002-06-18) cited in the application

   D2: US-A-2 181 680 (HOPPE WILLIAM) 28 November 1939 (1939-11-28)

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 to 6, 8 to 12, 14, 15, 18 to 23, and 25 to 29 does not involve an inventive step in the sense of Article 33(3) PCT.

   2.1. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document) a method for portion cutting of items including:
   - placing the items (12) on conveying means (10);
   - transporting the items to measuring means (36-42, 60, 62) and from the measuring means to cutting means (80) on the conveying means (10);
   - measuring at least one characteristic of each item with the measuring means (col 5, l. 10-42);
   - sectioning the items by the cutting means (col 6, l. 47-50);
   - controlling and regulating at least one cutting process parameter in order to achieve predetermined product portions based on the measured item characteristic (col. 6, l. 65 - col. 7, l. 5);

   whereby the controlling step comprises item boundary detection for determining the point of transition between consecutive items on the conveyor means based on said at least one measured item characteristic (col. 7, l. 9-12) and whereby the item boundary detection includes receiving successive item data sets from the at least one measured item characteristic and analysing the received data for identifying the boundaries between the consecutive items (col. 6, l. 19-26).

   The subject-matter of claim 1 therefore differs from this known method in that the items are placed abutting each other on said conveying means, which improves the

efficiency of the machine as no empty spaces between items have to be conveyed and prevents items from moving while being cut.

Although such a feature is already suggested in D1 (see D1, figs. 3A and 3B), it is described in document D2 as providing the same advantages as in the present application (see D2, col. 1, l. 20-25). The skilled person would therefore regard it as a normal option to include this feature in the method for cutting food products described in document D1 in order to solve the problem posed.

The subject-matter of claim 1 is therefore not inventive (Article 33(3) PCT)

2.2. All features included in independent claim 18 are also disclosed in the combination of the above mentioned documents D1 and D2, rendering said claim 18 also not inventive.

2.3. Dependent claims 2 to 6, 8 to 12, 14, 15, 19 to 23, and 25 to 29 relate to minor constructional features, which are partly revealed in the prior art quoted in the search report or which form part of the normal consideration of the person skilled in the art, i.e. they are the result of routine engineering and do not constitute an inspired design. Therefore the dependent claims 2 to 6, 8 to 12, 14, 15, 19 to 23, and 25 to 29 do not appear to contain any additional features which involve an inventive step when combined with the subject matter of any claim to which they refer (Article 33(2) and (3) PCT).

3. The additional features of dependent claims 7, 13, 16, 17, 24 and 30 of the present application are not disclosed nor suggested in their present form in any of the documents cited in the search report. The subject matter of claims is therefore considered as being new (Article 33(2) PCT) and involving an inventive step (Article 33(3) PCT).

17

PATENT CLAIMS

1. A method for cutting of items, such as food products, into portions of predetermined size, said method comprising the steps of

5   - placing the items on conveying means;

           - transporting the items to measuring means and from the measuring means to cutting means on the conveying means;

           - measuring at least one characteristic of each item with the measuring means;

10   - sectioning the items by the cutting means;

           - controlling and regulating at least one cutting process parameter in order to achieve predetermined product portions based on the measured item characteristic;

characterised in that

15   said items are placed consecutively and essentially abutting each other on said conveying means, and whereby the controlling step comprises item boundary detection for determining the point of transition between consecutive items on the conveyor means based on said at least one measured item characteristic, and whereby the item boundary detection includes receiving successive item data sets from the at

20   least one measured item characteristic; and analysing the received data for identifying the boundaries between the consecutively abutting items.

2. A method according to claim 1, whereby the item boundary detection includes

           - receiving successive item data sets from the at least one measured item
25   characteristic,

           - calculating the summary differences between two successive data set being the sum of the differences between a first data set and a second data set, and

           - identifying the calculated summary differences exceeding a predetermined
30   threshold, said identified summary differences representing a location of one point of transition between two items.

18

3. A method according to claim 2, whereby the controlling step comprises the summary difference between two data sets, comprising distance data from one or more sensors in the measuring means, are obtained by

5 $$\Sigma\Delta = |\Delta1| + |\Delta2| + |\Delta3| + ... + |\Delta n|,$$

where $\Sigma\Delta$ is the summary difference, $\Delta1$ is the difference between a first distance data and a successive second distance data from the first sensor in the measuring means, and 'n' is the number of sensors.

10 4. A method according to claim 2, whereby the controlling step comprises the summary difference between two data sets, comprising distance data from one or more sensors in the measuring means, are obtained by

$$\Sigma\Delta = |\Delta1/a| + |\Delta2/a| + |\Delta3/a| + ... + |\Delta n/a|,$$

where $\Sigma\Delta$ is the summary difference, $\Delta1$ is the difference between a first distance
15 data and a successive second distance data from the first sensor in the measuring means, 'n' is the number of sensors and 'a' is the length between the location of the first set of distance data and the location of the second set of distance data.

5. A method according to any of the preceding claims, whereby the measuring means
20 is a scanning device, preferably a ring scanner.

6. A method according to any of claims 1 to 2, whereby the measuring means include a scanning device, wherein at least one light source is arranged to emit at least one line of light towards the item and the reflected light is detected by sensor means
25 arranged at an angle, typically approx. 30° between the emitted and the reflected light beams.

7. A method according to claim 6, whereby the emitted at least one light line is oriented substantially parallel to the transporting direction of the items.

30

19

8. A method according to claim 6, whereby the emitted at least one light line is oriented across the conveyor.

9. A method according to any of claims 6 to 8, whereby the controlling step includes organising the measurements for defining at least one list of item characteristics representing a line characteristics along the items on the conveyor and calculating the summary difference between two data sets in said list, said summary difference being obtained by

$$\Sigma\Delta = |\Delta1| + |\Delta2| + |\Delta3| + \dots + |\Delta n| \, ,$$

where $\Sigma\Delta$ is the summary difference, $\Delta1$ is the difference between a first data set and a successive second data set in the item characteristics, and 'n' is the number of data sets.

10. A method according to any of claims 6 to 8, whereby the controlling step includes organising the measurements for defining at least one list of item characteristics representing a line characteristics along the items on the conveyor and calculating the summary difference between two data sets in said list, said summary difference being obtained by

$$\Sigma\Delta = |\Delta1/a| + |\Delta2/a| + |\Delta3/a| + \dots + |\Delta n/a| \, ,$$

where $\Sigma\Delta$ is the summary difference, $\Delta1$ is the difference between a first data set and a successive second data set in the item characteristics, 'n' is the number of data sets, and 'a' is the length between the location of the first data set and the location of the second data set.

11. A method according to any of claims 6 to 10, whereby the at least one measured item characteristic is the height of the items.

12. A method according to any of the preceding claims, whereby the items are aligned with the longitudinal direction of the abutting items.

13. A method according to any of the claims 1 to 11, whereby the items are mutually displaced relative to the longitudinal direction of the abutting items.

14. A method according to any of the preceding claims, whereby the conveying

5   means is a V-shaped conveyor.

15. A method according to any of the preceding claims, whereby the method includes weighing the items before the measuring.

10   16. A method according to any of the preceding claims, whereby a transition marker between items is inserted.

17. A method according to any of the preceding claims, whereby the measuring means include detecting in surface colour and/or texture and identifying changes

15   therein.

18. An apparatus for portion cutting of items, such as food products, said apparatus comprising

conveying means for transporting items placed on said conveying means to

20   measuring means for detecting at least one characteristic of the product, and onwards to cutting means for sectioning the items into portions,

control means for controlling and regulating at least one cutting process parameter in order to achieve predetermined item portions based on the measured item characteristics,

25   characterised in that

said items are placed consecutively and essentially abutting each other on said conveying means, and wherein the control means include item boundary detection means for determining the point of transition between two items based on said at least one measured item characteristic, and wherein the item boundary detection

30   means include receiving successive item data sets from the at least one measured

21

item characteristic; and analysing the received data for identifying the boundaries between the consecutively abutting items.

19. An apparatus according to claim 18, wherein the control means include item
5   boundary detection means, wherein

- successive product data sets are provided from the at least one detected item characteristic,

- the summary differences between two successive data set are calculated as being the sum of the differences between a first data set and a second data

10   set, and

- at least one point of transition between two items is located by identifying the calculated summary differences exceeding a predetermined threshold.

20. An apparatus according to claim 19, wherein the control means are provided with

15   the summary difference between two data sets, comprising distance data from one or more sensors in the measuring means by

$$\Sigma\Delta = |\Delta 1| + |\Delta 2| + |\Delta 3| + \ldots + |\Delta n|\,,$$

where $\Sigma\Delta$ is the summary difference, $\Delta 1$ is the difference between a first distance data and a successive second distance data from sensor 1 in the measuring means,

20   and 'n' is the number of sensors.

21. An apparatus according to claim 19, wherein the control means are provided with the summary difference between two data sets, comprising distance data from one more sensors in the measuring means by

25          $$\Sigma\Delta = |\Delta 1/a| + |\Delta 2/a| + |\Delta 3/a| + .. + |\Delta n/a|\,,$$

where $\Sigma\Delta$ is the summary difference, $\Delta 1$ is the difference between a first distance data and a successive second distance data from a first sensor in the measuring means, 'n' is the number of sensors and 'a' is the length between the location of the first set of distance data and the location of the second set of distance data.

30

22

22. An apparatus according to any of the claims 18 to 21, wherein the measuring means is a scanning device, such as ring scanner, measuring surface dimensions, colour and/or textures, such as exterior and/or interior characteristics.

5   23. An apparatus according to claim 18, whereby the measuring means include a scanning device, wherein at least one light source is arranged to emit at least one line of light towards the item and the reflected light is detected by sensor means arranged at an angle, typically approx. 30° between the emitted and the sensor position.

10   24. An apparatus according to claim 23, whereby the emitted at least one light line is oriented parallel to the transporting direction of the items.

25. An apparatus according to claim 23, whereby the emitted at least one light line is oriented across the conveyor.

15

26. An apparatus according to any of claims 23 to 25, wherein the control means include means for organising the measurements for defining at least one list of item characteristics representing a line characteristics along the items on the conveyor and calculating the summary difference between two data sets in said list, said summary

20   difference being obtained by

$$\Sigma\Delta = |\Delta 1| + |\Delta 2| + |\Delta 3| + ... + |\Delta n| \, ,$$

where $\Sigma\Delta$ is the summary difference, $\Delta 1$ is the difference between a first data set and a successive second data set in the item characteristics and 'n' is the number of data sets.

25

27. An apparatus according to any of claims 23 to 25, wherein the control means include means for organising the measurements for defining at least one list of item characteristics representing a line characteristics along the items on the conveyor and calculating the summary difference between two data sets in said list, said summary

30   difference being obtained by

$$\Sigma\Delta = |\Delta 1/a| + |\Delta 2/a| + |\Delta 3/a| + ... + |\Delta n/a| \, ,$$

23

where $\Sigma\Delta$ is the summary difference, $\Delta 1$ is the difference between a first data set and a successive second data set in the item characteristics, 'n' is the number of data sets, and 'a' is the length between the location of the first data set and the location of the second data set.

5

28. An apparatus according to claim 18 to 27, where the conveying means is a V-shaped conveyor.

29. An apparatus according to any of the claims 18 to 28, wherein the apparatus
10   includes weighing means for weighing the products.

30. An apparatus according to any of the claims 18 to 29, wherein the apparatus includes means for inserting a transition marker between the items.